

Zeitschrift: Mitteilungen der Schweizerischen Entomologischen Gesellschaft =
Bulletin de la Société Entomologique Suisse = Journal of the Swiss
Entomological Society

Herausgeber: Schweizerische Entomologische Gesellschaft

Band: 75 (2002)

Heft: 1-2

Artikel: Aradus lugubris Fallén, 1807 (Hemiptera, Heteroptera, Aradidae) in a
chestnut forest of Southern Switzerland after a fire experiment

Autor: Wyniger, Denise / Moretti, Marco / Duelli, Peter

DOI: <https://doi.org/10.5169/seals-402818>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 30.04.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Aradus lugubris FALLÉN, 1807 (Hemiptera, Heteroptera, Aradidae)
in a chestnut forest of Southern Switzerland after a fire experiment

DENISE WYNIGER¹, MARCO MORETTI² & PETER DUELLI³

The impact of forest fires on the arthropod fauna was studied in a fire experiment conducted in a chestnut forest in Southern Switzerland (Canton Ticino) in March 1998. Three standardised sampling methods were used: pitfall traps for epigeic arthropods, yellow window traps for flying insects, ground eclectors and litter-soil samples for soil dwelling groups. One group which was studied in detail, the true bugs (Hemiptera, Heteroptera), was sampled before and after the fire. *Aradus lugubris* FALLÉN, 1807, a pyrophilous species of Aradidae, was attracted by the burnt area. It was only collected after the fire, and only on the burnt forest sites but never on the control sites. Over a period of two weeks, 27 specimens of *A. lugubris* were collected by ground eclectors, pitfall and yellow window traps.

Keywords: Heteroptera, Aradidae, *Aradus lugubris*, pyrophilous, forest fire, chestnut.

INTRODUCTION

Most forest fires in Switzerland occur on the southern slope of the alps, in the canton Ticino, during the winter. Since the 1960ies, the number of forest fires has drastically increased and, from the 1970ies onwards, fires occur more and more also during summer (CONEDERA et al. 1996). This is not only a consequence of climatic change but also of the stop of extraction of fire wood by the local people (CONEDERA et al. 1997). The latter leads to an accumulation of combustible material increasing the fire risk (CONEDERA et al. 1996). A few insect species, called pyrophilous, are attracted by fire, heat or smoke (EVANS 1971, WIKARS 1992). For some of them a population increase can be noticed for a short period of time after the outbreak of fire (CHANDLER et al. 1983). In Heteroptera there are pyrophilous species known from the family Aradidae (flat bugs). Aradidae are forest insects predominantly living under and on the bark of dying, dead and burnt trees, always associated with fungi. Some species feed on polyporous fungi, e.g. *Aradus corticalis* (LINNAEUS, 1758), *A. betulinus* FALLÉN, 1829, *A. pictus* BÄRENSPRUNG, 1859 (TAMANINI 1956, HELIÖVAARA & VÄISÄNEN 1983) or on the phloem of living trees, such as *A. cinnamomeus* PANZER, 1806 on *Pinus* sp. As part of the EU-project "PROMETHEUS s.v.", the WSL Sottostazione SdA in Bellinzona conducted a fire experiment in a chestnut forest in Southern Switzerland. One kg/m² of chestnut litter was put on the lower part of the test area and the upper part was left untreated (MARXER & CONEDERA 1999). One aim of the experiment was to simulate two different fire intensities for studying ecological effects of a forest fire in relation to fire intensity. The influence of fire intensity on insects was studied by HERZOG (1998) and WYNIGER (1999).

¹ Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland; Denise.Wyniger@stud.unibas.ch

² Eidg. Forschungsanstalt WSL Sottostazione Sud delle Alpi, Via Belsoggiorno 22, cp 57, CH-6504 Bellinzona-Ravecchia, Switzerland; marco.moretti@wsl.ch

³ Eidg. Forschungsanstalt WSL, CH-8903 Birmensdorf, Switzerland; duelli@wsl.ch

MATERIAL AND METHODS

The test area is situated in the Canton Ticino, community St. Antonino, at 500 m above sea level (720 000 / 112 000). The surface, including the control area, was 1 ha, the totally burnt site was 0.23 ha.

To study the influence of the forest fire on insects, four standardised sampling methods were installed six weeks before the fire experiment took place on March 28: 22 pitfall traps (DUELLI et al. 1999), 16 ground eclectors (MÜHLEBERG 1993), 9 yellow window traps (DUELLI et al. 1999) and litter-soil samples (MORETTI et al. 1998). On the experimental site the pitfall traps were re-installed the same day, just after the fire, all the other traps one day after the fire (HERZOG 1998, WYNIGER 1999). From February 10 until June 30, 1998, the traps were checked weekly (WYNIGER 1999), except for the first sixteen days after the fire when they were checked daily (HERZOG 1998).

RESULTS

27 specimens of *Aradus lugubris* were collected after the fire experiment (WYNIGER 1999): 14 by pitfall traps, 11 by yellow window traps and two by ground eclectors. No specimen was found in litter-soil samples. Before the fire experiment, *A. lugubris* was not collected at all and after the fire, it could only be found on the burnt area, but never on the control plot (WYNIGER & DUELLI 2000). The first specimen was collected the day after the fire experiment and another seven in the following five days (Fig. 1). During the following three weeks no *A. lugubris* speci-

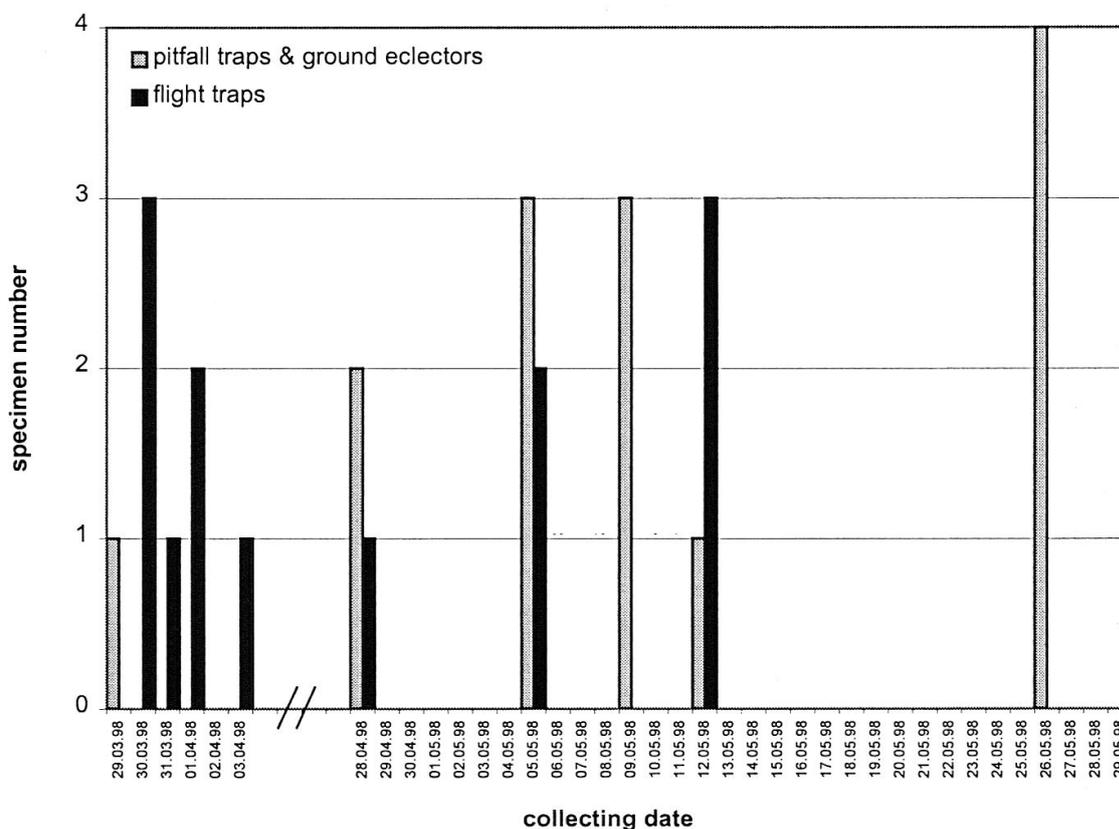


Fig. 1. Specimens of *Aradus lugubris* FALLÉN, 1807 collected by different traps.

mens were found (Fig. 1). Afterwards another 19 specimens were found until May 26, 1998. After that period no additional specimen was found. *A. lugubris* is known also from other freshly (naturally) burnt forests of the Canton Ticino (WYNIGER 1999).

DISCUSSION

Forest fires remove the existing fauna and hence create new substrates open for colonisation. The quick arrival of a species in a newly burnt area may be, therefore, vital for a successful colonisation. The higher temperature in burnt areas after the fire and the growing fungi are additional positive factors (WIKARS 1992). Most of the pyrophilous species live and breed during the time without forest fire on unburnt (dead or living) trees (EVANS 1971, HELIÖVAARA & VÄISÄNEN 1983, WIKARS 1992). *Aradus lugubris* does not require forest fires (HELIÖVAARA & VÄISÄNEN 1983) but, when available, seems to prefer burnt areas; copulation in newly burnt areas has been observed (WIKARS 1992). *A. lugubris* seems to be able to exploit temporary resources reacting quickly to new environmental circumstances.

In the days just after the fire, most catches took place in the yellow window traps, indicating an approach of the bugs by flight (Fig. 1). After that initial period of flight activity, more specimens were collected in the pitfall traps and the eclectors on the ground. Both flight and ground traps reflect the kind and degree of activity of epigeic arthropods (HALSALL & WRATTEN 1988, OBRIST & DUELLI 1996). This first active phase enabled the insects to find the most suitable feeding and/or breeding habitats. *A. lugubris* is attracted by the fast growing fungi after a forest fire (e.g. Ascomycetes). These fungi constitute the food for the offspring (WIKARS 1997). Later on, other fungi (e.g. *Fomes*, *Trametes*) provide additional food resources (HEISS, pers. com.). A similar behaviour can be observed for *Aradus annulicornis* FABRICIUS, 1803 (= *anisotomus* PUTON, 1879), *A. crenaticollis* R. F. SAHLBERG, 1848 and *A. signaticornis* R. F. SAHLBERG, 1848 (WIKARS 1997). The reason for the intermittent phase lacking records may be the wet and colder weather during that time (HERZOG 1998).

ACKNOWLEDGMENTS

We thank Marco CONEDERA and Peter MARXER (WSL Sottostazione SdA, Bellinzona) for providing information and Ernst HEISS (Innsbruck, Austria) for confirming the identifications. He and Daniel BURCKHARDT (Basel) provided useful comments on the manuscript. Franco FIBBIOLI and Karl SIEGRIST helped in the field which is gratefully acknowledged. DW is particularly grateful to Sabine HERZOG for sharing a great time in the field.

REFERENCES

- CHANDLER, C., CHENEY, P., THOMAS, P., TRABAUD, L. & WILLIAMS, D.S. 1983. *Fire in forestry Vol. 1. Forest fire behavior and effects*. Wiley & Sons, New York, 450 pp.
- CONEDERA, M., MARXER, P., HOFMANN, C., TINER, W. & AMMAN, B. 1996. Forest fire Research in Switzerland. Part 1: Fire Ecology and History Research in the southern Part of Switzerland. *International Forest Fire News* 15: 13–21.
- CONEDERA, M., MARXER, P. & MORETTI, M. 1997. Waldbrandforschung an der WSL Sottostazione Sud delle Alpi. *Schweizer Wald* 12: 18–20.
- DUELLI, P., OBRIST, M. & SCHMATZ, D. R. 1999. Biodiversity evaluation in agricultural landscapes: above-ground insects. *Agriculture, Ecosyst. Envir.* 74: 33–64.

- EVANS, W. G. 1971. The attraction of insects to forest fires. *Proc. Tall Timbers Conf. Ecol. Anim. Cont. by Habitat Mgmt.* 3: 115–127.
- HALSALL, N. B. & WRATTEN, S. D. 1988. The efficiency of pitfall trapping for polyphagous predatory Carabidae. *Ecological Entomology* 13: 293–299.
- HELIÖVAARA, K. & VÄISÄNEN, R. 1983. Environmental changes and the flat bugs (Heteroptera, Aradidae and Aneuridae). Distribution and abundance in Eastern Fennoscandia. *Ann. Ent. Fenn.* 49: 103–109.
- HERZOG, S. 1998. *Der direkte Einfluss des Feuers auf die Arthropodenfauna bei einem experimentellen Waldbrand im Kanton Tessin*. Diplomarbeit ETH Zürich, 74 pp.
- MARXER, P. & CONEDERA, M. 1999. Prometheus s.v. Fire Experiment in Switzerland (S. Antonino, 28 March 1998). *Int. For. Fire News* 20: 93–96.
- MORETTI, M., PATOCCHI, N., CONEDERA, M., DUELLI, P. & EDWARDS, P. J. 1998. The influence of single and repeated fires on invertebrates in chestnut forests in southern Switzerland: first results. In: TRABAUD, L. (ed.), *Fire Management and Landscape Ecology*, pp. 237–245. International Association of Wildland Fire, Fairfield, Washington.
- MÜHLEBERG, M. 1993. *Freilandökologie*. 3. Auflage. UTB 595. Quelle & Meyer, Heidelberg, 512pp.
- OBRIST, M. & DUELLI, P. 1996. Trapping efficiency of funnel- and cup-traps for epigeal arthropods. *Mitt. Schweiz. Ent. Ges.* 69: 361–369.
- TAMANINI, L. 1956. Osservazioni biologiche e morfologiche sugli *Aradus betulinus* FALL., *A. corticalis* L., *A. pictus* BÄR. *Rivista Mus. St. Nat. Venezia Tridentina* 333: 1–3.
- WIKARS, L.-O. 1992. Skogsbränder och insekter. *Ent. Tidskr.* 113 (4): 1–11.
- WIKARS, L.-O. 1997. Pyrophilous insects in Orsa Finnmark, Central Sweden: biology, distribution, and conservation. *Ent. Tidskr.*, 118 (4): 155–169.
- WYNIGER, D. 1999. *Direkter und indirekter Einfluss von Waldbränden auf die Wanzenfauna im Tessiner Kastanienwald*. Diplomarbeit Universität Basel, Zoologisches Institut, 69 pp.
- WYNIGER, D. & DUELLI, P. 2000. Die Entwicklung der Wanzenfauna (Heteroptera) nach einem experimentellen Waldbrand im Tessiner Kastanienwald. *Mitt. Dtsch. Ges. angew. Ent.* 12: 425–428.

(received November 15, 2001; accepted March 26, 2002)